

April 21, 2000

SPACE CENTER Roundup

VOL. 39, NO. 8 LYNDON B. JOHNSON SPACE CENTER, HOUSTON, TEXAS

JSC community remembers former deputy director

Remembered by many as a wonderful human being and a man of great integrity, former Johnson Space Center Deputy Director Sigurd A. Sjoberg died on March 26. He was 80 years old.

“Sig,” as he was fondly known, didn’t like to work in the limelight; he much preferred to work behind the scenes, working on issues and problems throughout his long and distinguished career with the National Advisory Committee for Aeronautics at Langley, and then here in Houston at JSC. People depended on him to get things done. His skills in both engineering and management earned him the respect of the international community.

He started his career at the Flight Research Division of the Langley Aeronautical Laboratory of the National Advisory Committee for Aeronautics in 1942. He worked on many of the WWII airplanes, which included the Bell Aircobra. He was prominent in extending this era of airplanes to the use of jets and was responsible for testing the Navy F9F jet fighter among others. He spent several years at Edwards Air Force Base during the late '40s flight testing the Bell X-1 and X-2 and was the NACA project engineer on the Douglas D-558, which extended the supersonic speed range.

Sjoberg was a NACA expert in the development of automatic stability and control and helped develop the F-101 adaptive autopilot test program. Due to his experience and renown, Dr. Sjoberg was chosen to assist in the evaluation of North Atlantic Treaty Organization aircraft in France during 1957. During the evaluation, comparative tests were performed on a number of European fighters. Using the data submitted by test pilots regarding the handling qualities of the aircraft, Sjoberg submitted recommendations in the evaluation group’s final report.

In 1959, Dr. Sjoberg joined NASA’s Space Task Group as the operations coordinator of the Flight Operations Division, and later as assistant to the chief of Flight Operations. He helped develop the basic concepts of the Mercury Project, and by integrating the data, launch support, recovery, and range instrumentation requirements of the various aerospace industries and governmental agencies into an operational support system for Project Mercury, Dr. Sjoberg contributed to the success of the first American manned space flights.

As the Manned Spacecraft Center was being established in Houston, Dr. Sjoberg became the manager of Operations, Planning, and Development in the Flight Operations Directorate. He provided technical and managerial direction to guide the design, development, and construction of the Mission Control Center needed for the more challenging Gemini and Apollo missions. Sjoberg viewed the greatest accomplishments of the Gemini Program to be the human space flight experience gained and the operations expertise perfected. He believed that the United States could not have gone to the Moon without it.

Concurrently, Dr. Sjoberg led the planning and establishment of a worldwide Manned Space Flight Network for the tracking, support, and recovery of American manned space missions. He was heavily involved in the final decisions on the number, location, and configuration of tracking stations around the world. As the Apollo missions developed, Dr. Sjoberg was heavily involved in the decision of where and when to locate how many tracking ships around the world for the recovery of the Apollo crews. His studies included the cost of each vehicle, and its associated instrumentation to ensure the best recovery system, and that every craft used was required. His expertise allowed a significant savings and avoided potential delays in America’s pursuit of the Moon. Before lunar operation began, Sjoberg personally visited many of the ships and



NASA JSC Photo S70-35013

From left, Donald Slayton, Director of Flight Crew Operations; Howard Tindall, Deputy Director, Flight Operations; Sigurd Sjoberg, Director, Flight Operations; Christopher Kraft, Deputy Director of MSC; and Robert Gilruth, Director of MSC, discuss a prototype of the “mail box” device that was designed to remove carbon dioxide from the Apollo 13 Command Module.

Sig was a major contributor to the success of the Johnson Space Center. This country owes a great deal to him for his contributions to the space program.

– Chris Kraft



NASA JSC S67-23639

Sigurd Sjoberg

installations around the world to assure that they were prepared to support the Moon landings, and to emphasize to the individuals involved the importance of their roles.

Appointed to the position of deputy to the director of Flight Operations in 1965, Dr. Sjoberg had associate responsibility for directing mission planning and operational control of the Gemini missions while also managing the mission planning and flight control preparation for the Apollo missions.

For the Apollo missions, Dr. Sjoberg provided technical direction for outlining the trajectory requirements for the lunar missions, and the ground and on-board guidance computer programs needed to make complex maneuvers. The Apollo spacecraft needed to be able to perform lunar orbit insertion, lunar landing, lunar ascent, lunar orbit rendezvous, and transearth injection very precisely.

In December 1969, Dr. Sjoberg became the director of Flight Operations. With the new position came the responsibilities of directing the development and implementation of flight operations support for current and future American manned space missions. The Apollo 13, 14, and 15 missions flew under Sjoberg’s guidance. When an oxygen tank exploded damaging the Command and Service Module during Apollo 13, all power and

Please see **SJOBERG**, Page 7



Service module brightens station’s future.

Page 2



Engineers Week focuses on local students.

Page 4



Propulsion team takes high honors.

Page 7

Target launch of Russian star brightens space station future

The International Space Station Program received a new shot of optimism with the announcement of target launch dates for Russia's Zvezda service module.

Zvezda (Russian for "Star") is scheduled to launch between July 8 and 14 from the Baikonur Cosmodrome in Kazakhstan, NASA and the Russian Aviation and Space Agency announced.

"The service module launch will continue the creation of the ISS and will kick off the 3A through 7A flight sequence," said Tommy Holloway, manager of the International Space Station Program. "Phase II is within our grasp!"

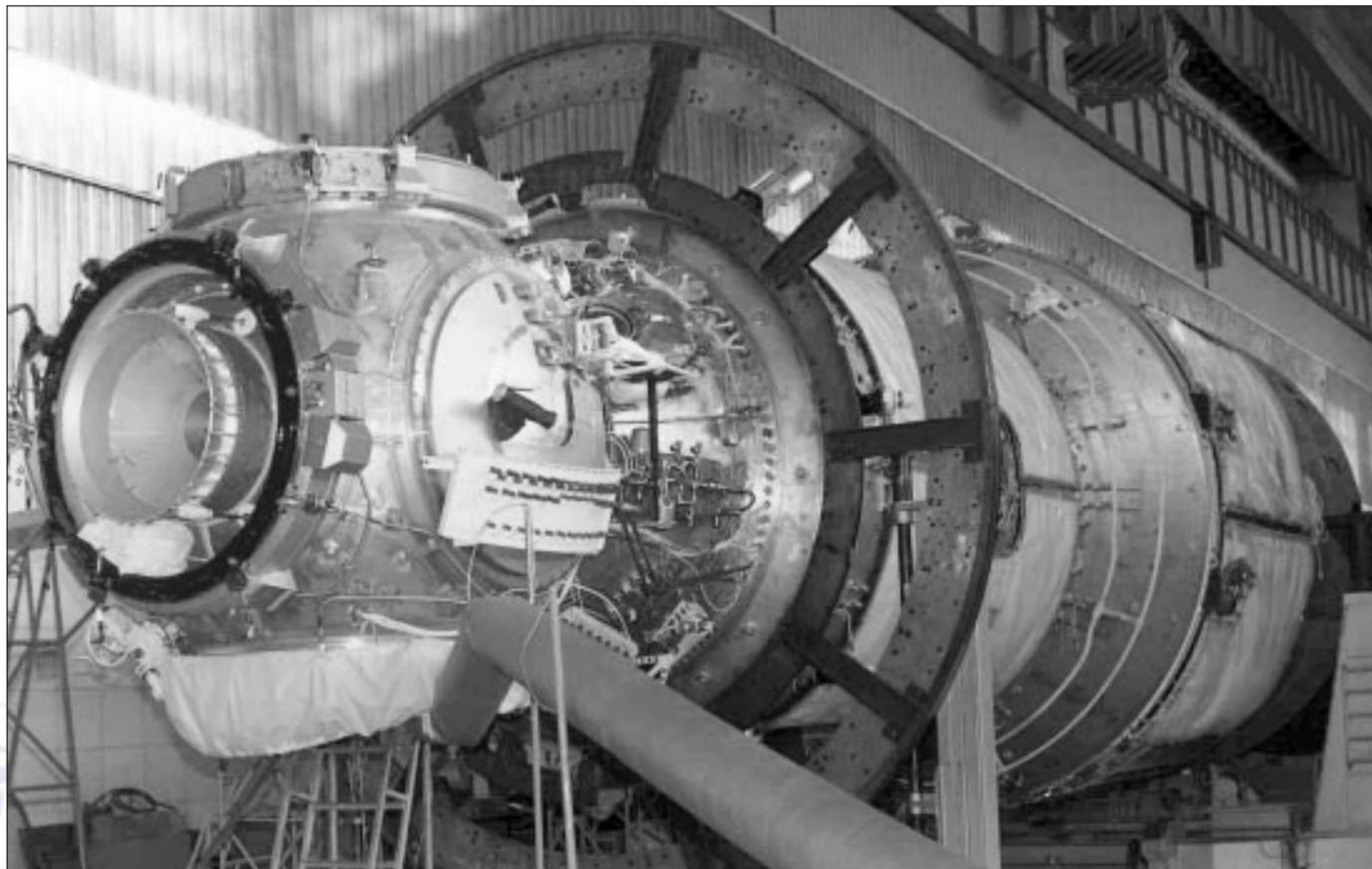
Zvezda – the early living quarters for crews aboard the station – will be launched on a Proton rocket with second and third stage engines modified to increase reliability.

The final service module launch date will be dependent on several factors, most importantly, lighting conditions over Russian ground stations at docking. RSC-Energia wants to ensure ideal lighting conditions for the external video cameras on both modules during the critical activity as well as optimum ground station and Early Communication System data for the Kurs automatic docking system while over Russian ground sites and through the TDRS S-band system.

Failures of the Russian's Proton rockets last year added to setbacks in the service module's schedule; however, Russian investigators have concluded that the failures were the result of a second stage turbopump fire caused by engine contamination introduced during manufacturing.

According to Holloway, two major steps have been undertaken to increase the reliability of the Proton scheduled for the service module launch. First, inspection and cleaning procedures have been implemented. Second, design changes that increase resistance to ignition have been implemented.

"Russian Proton engine experts have thoroughly briefed us and we believe that the steps they have taken increase the



NASA JSC Photo S98-04906

The first fully functional Russian contribution to the International Space Station, the service module will provide early power, propulsion, life support, communications and living quarters for the station.

Proton engine reliability," said Holloway. "We concur with their plan."

The 42,000-pound Zvezda will not only provide early living quarters for astronauts and cosmonauts, but also the life support system, electrical power distribution, data processing system, flight control system, and propulsion. While many of these systems will be supplemented or replaced by later U.S. station components, Zvezda always will remain the structural and functional center of the Russian segment of the International Space Station.

Zvezda has a solar-array wingspan of 97.5 feet tip to tip, and is 43 feet long from end to end. The module contains three pressurized compartments and four docking ports.

Following Zvezda's launch and about 15 days of free flight, the ISS will rendezvous and dock with its newest module.

Launch of Zvezda sets the stage for the launch of other ISS components undergoing final testing at NASA's Kennedy Space Center in Florida.

These components include a small truss segment that will serve as the support structure for other station hardware; the first set of solar arrays; the United States Destiny laboratory; the Canadian-built space station robot arm; and several truss segments that will serve as the station's backbone for external hardware, experiments and solar arrays.

"Today, more than 85 percent of the U.S. hardware is down in Florida," said

Holloway. "We have ten flights of hardware in preparation at KSC. Five of those flights are in the final preparation with margin in the schedule."

Holloway added that the Multi-Element Integration Test for 3A, 4A and 5A has also been successfully concluded.

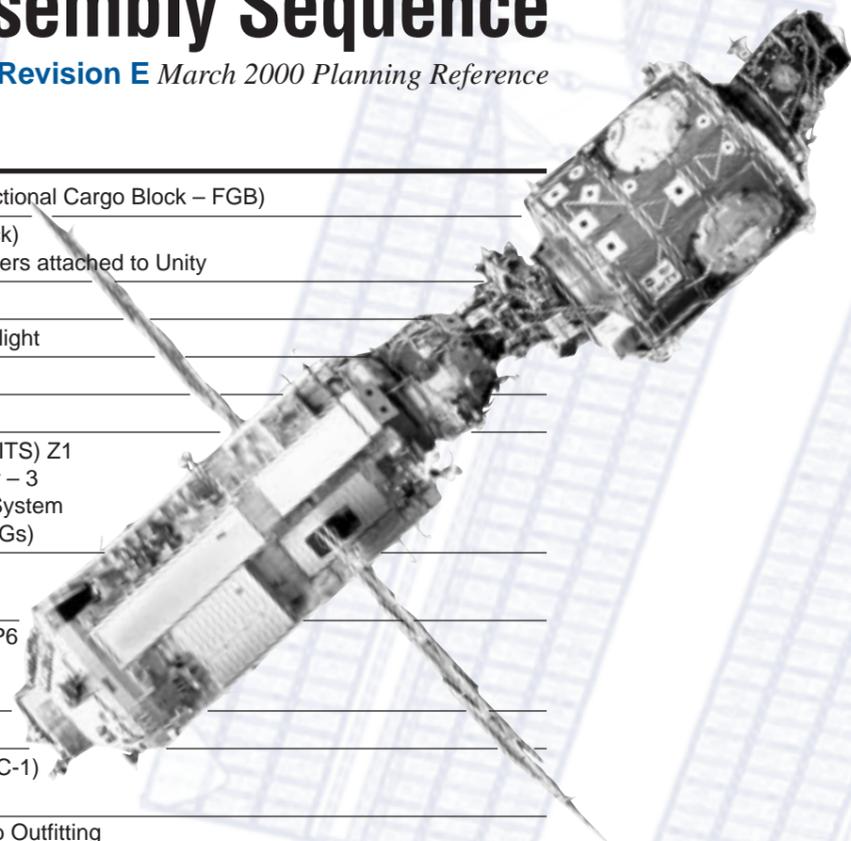
Other key station components are under development and testing in Europe and Japan.

"At this point, we are ready to get on with the creation of the International Space Station," said Holloway. "The challenges are huge but the opportunities are greater." ■

International Space Station Assembly Sequence

Revision E March 2000 Planning Reference

Date	Flight	Launch Vehicle	Element(s)
November 20, 1998	1A/R	Russian Proton	◆ Zarya Control Module (Functional Cargo Block – FGB)
December 4, 1998	2A	US Orbiter STS-88	◆ Unity Node (1 Stowage Rack) ◆ 2 Pressurized Mating Adapters attached to Unity
May 27, 1999	2A.1	US Orbiter STS-96	◆ Spacehab – Logistics Flight
April 24, 2000	2A.2a	US Orbiter STS-101	◆ Spacehab – Maintenance Flight
July 8-14, 2000	1R	Russian Proton	◆ Zvezda Service Module
August 19, 2000	2A.2b	US Orbiter STS-106	◆ Spacehab – Logistics Flight
September 21, 2000	3A	US Orbiter STS-92	◆ Integrated Truss Structure (ITS) Z1 ◆ Pressurized Mating Adapter – 3 ◆ Ku-band Communications System ◆ Control Moment Gyros (CMGs)
October 30, 2000	2R	Russian Soyuz	◆ Soyuz ◆ Expedition 1 Crew
November 30, 2000	4A	US Orbiter STS-97	◆ Integrated Truss Structure P6 ◆ Photovoltaic Module ◆ Radiators
January 18, 2001	5A	US Orbiter STS-98	◆ Destiny Laboratory Module
February 9, 2001	4R	Russian Soyuz	◆ Docking Compartment 1 (DC-1) ◆ Strela Boom
February 15, 2001	5A.1	US Orbiter STS-102	◆ Logistics and Resupply; Lab Outfitting ◆ Leonardo Multi-Purpose Logistics Module (MPLM) carries equipment racks
April 19, 2001	6A	US Orbiter STS-100	◆ Raffaello Multi-Purpose Logistics Module (MPLM) (Lab outfitting) ◆ Ultra High Frequency (UHF) antenna ◆ Space Station Remote Manipulator System (SSRMS)
May 17, 2001	7A	US Orbiter STS-104	◆ Joint Airlock ◆ High Pressure Gas Assembly
June 21, 2001	7A.1	US Orbiter STS-105	◆ Donatello Multi-Purpose Logistics Module (MPLM)
August 23, 2001	UF-1	US Orbiter STS-109	◆ Multi-Purpose Logistics Module (MPLM) ◆ Photovoltaic Module batteries



P E O P L E I N T H E N E W S

Luck of the Irish

They've come a long way from attending school in Indiana, but these two Notre Dame graduates have found their home in Clear Lake working for the nation's space program.

Annette and Pete Hasbrook are one of many couples that share JSC as a work-site. In fact, both are part of the Flight Control Team. Annette is the group lead for the Cargo Support Engineering Group (Payloads) and Pete is the group lead for the Shuttle Environmental Systems Group (EECOM).

STS-99 was the first time in their 12 and a half years at JSC that the two have worked the same mission, in the Mission Control Center front room on the same shift, a very rare occurrence despite the number of employees who have a spouse-coworker on site. For some, working with your spouse might seem like the potential for conflict, but the Hasbrooks say their relationship is actually mutually beneficial.

"As group lead, my role involves being the networking person, so through Annette, I've come to know a lot of the players who work in payloads which is very helpful," said Pete Hasbrook.

Annette Hasbrook agrees. "It helps 'grease the skids' a little. We can help avoid what might become a clash later by simply giving each other a heads up that 'hey, we've got this issue coming so you might want to have someone start working it.'"

"It helps to see the other person's perspective," added Pete Hasbrook. "We get the cross-training without having to actually cross-train."

So how did the Hasbrooks end up here together? The two met through a choral group while students at Notre Dame in the early-80s. Pete Hasbrook co-oped with IBM as an aerospace engineering student and at that point decided he wanted to make a career in the space industry. He joined JSC in the Flight



NASA JSC Photo JSC2000-02577 by Robert Markowitz

Pete, left, and Annette Hasbrook make a winning team for JSC.

Activities branch (FAO) after graduating in 1985. That same year, Annette Hasbrook used her bachelor's degree in mechanical engineering to join Andersen Consulting in the Bayou City.

Two years later, the Shuttle Program began ramping up for its newly invigorated flight schedule and Annette Hasbrook transitioned from the private sector to a civil servant position with JSC's Payload team.

Annette Hasbrook said one of the early benefits was improved communications with her husband. "Once I started working here, I understood all the acronyms he had always been throwing around," she said.

Although some people might wonder about their own ability to work with their spouse, the Hasbrooks enjoy it and don't think there is any special secret to making the situation work.

"We always try to listen to each other and appreciate what each other is going through," said Annette Hasbrook. "Otherwise you can get caught in a death spiral."

"We try to leave work at work," said Pete Hasbrook. With philosophy like that, maybe they don't need luck after all. ■

Relationships 101

Relationships, whether between family members, coworkers or spouses, can be one of the biggest contributors of stress. So says Jackie Reese, MA, LPC, director of JSC's Employee Assistance Program and Gail Howell, ACSW, LMSW-ACP, EAP counselor.

With a population of 13,000, JSC can seem like its own little world at times and can result in many relationship dynamics that can produce added stress in the workplace. Not only is JSC host to many married or dating employees, but there are also many family members, some spanning generations, that are represented in the NASA program.

"Sometimes employees can feel an added sense of pressure when they have family members who also work here, who maybe have done some pretty historic and extraordinary things," said Reese. "They can leave pretty big shoes to fill."

Generally speaking, the caliber of people attracted to the space program

makes for interesting challenges when it comes to relationships. Most employees here are very committed to their work, highly educated and very ambitious.

"They are very skilled and motivated," said Reese. "They experience so much passion toward their work and get so much satisfaction from it that they sometimes don't see the need to make time for their relationships outside of work."

Howell agrees and says that sometimes that commitment to the space program is often what bonds so many couples.

"They have a common ground with each other," said Howell. "Where else can they find so many other brilliant, ambitious individuals with similar interests? They have a unique understanding for what the other person is going through."

"Relationships at the workplace CAN work," Reese and Howell agree, "but you have to know and respect the rules."

The Employee Assistance

Program is available for all JSC employees and contractors and their dependents. For more information on this confidential service call x36130. ■

For couples who work together, Reese and Howell offer the following suggestions to minimize relationship-related stress.

- **Keep your roles clear.**

"You can't be a spouse at work, and don't be 'at work' when you're with your spouse," said Reese. "Respect those boundaries. That can be tricky, especially for couples who work closely and might be tempted to cross the line."

- **Communicate.**

"Be willing to listen and talk about your feelings," said Howell. "Validate each other's feelings and respect the other person's perspective, even if you don't always agree."

- **Don't isolate yourselves.**

"Have your spouse be a part of your support system but not your only supporter," said Reese. "It's important to find the right balance. Go out to lunch with coworkers or colleagues to maintain those relationships as well."

- **Find the time.**

"At JSC, no one thinks twice about working a 50- or 60-hour week, but you have to make sure you find the time for your relationship," said Howell. "You can't maintain a quality relationship without dedicating some time and energy to it."

Employees share joy of engineering with local students

This year, JSC celebrated nine years of observing National Engineers Week when some 165 civil service and contractor employees visited elementary, middle and high school classrooms to encourage students to

The visits were part of a national outreach program called Discover "E" ("E" for Engineering). This year's activities continued through March.

"We thank Team NASA for its substantial increase in support which

"Although the focus was on engineering for National Engineers Week, we had a lot of fun going around the room thinking of different NASA jobs for students in the class," said Trainor. "One girl expressed an interest in sports, so we decided that she could be a physical trainer for the astronauts in training or help rehabilitate them upon their return to Earth. Another boy expressed an interest in architecture, so we decided that he could design an outpost on Mars. It was fun to talk about dreams and share in their imagination and enthusiasm."

To make her presentation as interactive as possible, Trainor tossed NASA antenna balls to students who asked good questions or answered questions correctly. Tony Smith, a major in the U.S. Air Force and Department of Defense Shuttle and International Space Station Payloads deputy director, used a similar technique, rewarding students with mission stickers.

"My first goal was to cover the main objective of National Engineers Week which is to enlighten students on what an engineer is and what one does," said Maj. Smith. "We began by making a list of as many types of engineers that the students could come up with and describing what each one does."

"Once this main objective was met, I showed the students some applications from the perspective of a space shuttle mission. We talked about the various disciplines used in launch, on-orbit operations, and re-entry. I had them call out the main types of engineers involved in the different phases of flight and why a certain type of engineer would be involved. The students were very involved and, in the end, appeared to have a better understanding of what engineers do and could apply their new knowledge to address how certain fields are involved in certain tasks."

Maj. Smith says that getting students interested in whatever profession they want to pursue should be encouraged at an early age. "I learned it is never too early to start them down the path to

pursue whatever dream they may have. But it is really up to us, as adults, to ensure they have the knowledge and experiences to formulate these dreams."

For the second consecutive year, astronauts participated in NEW activities. NASA Astronauts Dr. Bonnie Dunbar, Rex Walheim, and Astronaut Candidate Gregory H. Johnson visited local schools.

Dr. Dunbar, JSC assistant director for University Research and Affairs, is also the NASA representative to the NEW Board in Washington, D.C. The Board consists of representatives from all of the major engineering societies, as well as federal agencies, which depend upon the continual education of engineers in this country. She stated that there is growing concern regarding the decrease in engineering graduates in this country, a decline that started in the late 1980s. Both aerospace and electrical engineering graduates have declined approximately 50 percent since peaking in 1987.

Because of the near term impact on technology and economic development in this country, the National Academy of Engineers has also become involved, both in studies to determine the reasons behind the decline as well as in developing strategies for encouraging more students to study math and science in order to prepare for engineering careers.

"We need to make certain that today's youth are literate in math and science," Dr. Dunbar said. "Without this background, they cannot go on to pursue a career in engineering."

The Department of Defense recently addressed the NEW board, stating that the decline in U.S. engineering graduates was impacting the nation's defense readiness. The early days of the space program were a tremendous incentive for a generation of students to study engineering, and it provides a vehicle to continue the interest of students.

Neil Armstrong keynoted a National Press Club luncheon in February sponsored by the NAE announcing the great 20th Century engineering achievements. Landing on the Moon was among them, although "electrification" was elected in first place. Maintaining U.S.

Please see **ENGINEERS**, Page 5



NASA JSC Photo 2000-01780 by Bill Stafford

Joy Conrad, a software analyst with Averstar, demonstrates the outer space environment with a vacuum pump to students of Wedgewood Elementary School. A student prepares to eat a marshmallow that Conrad had just deflated.

pursue careers in engineering, science, math and technology. These fields of study have seen steep declines in enrollment across U.S. universities over the past 13 years – a matter of concern to NASA and to aerospace contractors since this is the pipeline that supplies them.

The volunteers who visited the schools provided more than 450 classroom presentations at 115 schools to an estimated 12,000 students and teachers in the local educational community. For 2000, 101 contractor employees provided engineering career presentations from the following 16 companies: Averstar, Barrios Technology, The Boeing Company, Draper Labs, Dynacs Engineering, G. B. Tech, Hamilton Sundstrand, Hernandez Engineering, Honeywell, Indyne, Inc., Johnson Engineering, Lockheed Martin, Raytheon, SAIC, United Space Alliance, and Wyle Laboratories.

made this year's program so successful," said Nancy Robertson, chief of the Education and Community Support Branch in the Public Affairs Office. "This program shows the strength of combining our civil service and contractor volunteers to meet a common education goal."

The volunteers shared their unique space-related knowledge with students and teachers as part of JSC's commitment to the local educational community. During their classroom presentations, they engaged students by using a variety of hands-on experiments and visual props like spacesuit items, helmets, and gloves.

Debbie Ramos Trainor, NASA increment training integrator, Expedition 1, spoke on the International Space Station Program to a class of fifth graders at Stuchberry Elementary School in the Pasadena Independent School District.



NASA JSC Photo JSC2000-05253 by James Blair

Debbie Ramos Trainor, NASA increment training integrator, Expedition 1, speaks to students at Stuchberry Elementary School.

**For information
on volunteer opportunities call Robin Hart at
281-483-4754.**

For more information on NEW and the engineering profession visit
<http://www.eweek.org>
and <http://www.discoverengineering.org>.

Unique program prepares Texas students for careers in engineering

Hundreds of high school juniors from across Texas are improving their aptitude in math, science, engineering, and computer science via a unique online distance learning project. They're participating in the Texas Aerospace Scholars Program, an educational outreach program that recently began between JSC and the State of Texas. The objective is to increase the number of students choosing to enter the engineering field.

"The United States continues to see a decline in the number of students pursuing degrees in science and engineering," said Mike Kincaid, chief of the HR Development Branch. "This is one way that we can help reverse the decline."

The focus of study for the initial 12-week spring semester, which began in February, is the exploration of Mars. The six-unit curriculum covers the history of Mars, geology of Mars, robotic exploration, human factors, first human missions, and possible Martian colonization. Each unit has a series of chapters, an assignment to be turned in via e-mail, an interactive online quiz, and ideas for a final project that the students are required to turn in at the end of the semester. Each unit also includes many links to virtual reality models, simulations, interactive tutorials, videos, animations and

information sites for additional research.

Students access the curriculum via the Internet at <http://aerospacescholars.jsc.nasa.gov>. After reviewing the lesson material, they complete their assignment on-line and take the unit quiz. In addition, the students conduct research, submit research questions and design their unit specific missions. They have two weeks to complete each unit. Since the curriculum is a combination of research report writing, essay writing, and design drawing, by the time they get to their final projects, they'll have an idea of what topic is of most interest to them about Mars exploration. At the end of the semester, they will submit their final projects to be posted on the Web.

There is also plenty of on-line assistance if the students need additional help. Mentors, comprised of JSC civil servants and contractor employees, teachers, and school counselors, will be available for e-mails and online chat sessions. JSC co-ops will help out as well and share their insight.

The spring semester curriculum will be followed by a one-week summer session at JSC. To maximize the learning opportunity, the students have been divided into eight different weeks and are scheduled to visit JSC in June and July. During each session, the students will work in

teams with a mentor, a teacher, and a co-op on Mars exploration projects, and present a project on "Getting There, Living There, and Working There." To accomplish this, each team will look at propulsion systems for travel to Mars, engineering designs for Martian habitats, human factors in long-duration space travel, and numerous other issues that are facing engineers and scientists. The teams will display their projects for family members, Texas legislators, NASA officials, and other guests during a banquet to be held at the end of the week.

In addition to completing the team project, the students will tour JSC facilities and take field trips to Space Center Houston, Moody Gardens, and the Houston Museum of Natural Science Challenger Center during the summer session. Students will receive briefings from JSC engineers, scientists, and astronauts, and spend some time visiting their mentor's work environments.

Students from around Texas were nominated to attend this program by the 181 members of the Texas Legislature. Each legislator selected one or two students from their district to nominate for the program. In addition, a donation from the Rotary National Award for Space Achievement Foundation raised the total

number of students enrolled in the spring semester from 200 to 230.

Enrollment for the fall semester is expected to double, and additional lessons on the Space Shuttle, International Space Station, and Moon Exploration will be added to the Mars lessons to increase the curriculum to 24 weeks. The fall and spring online session will be followed by a one-week visit to JSC in the summer of 2001.

Applications for the fall semester, the 2000-2001 program, will go to the Texas legislators in August. Applicants must be at least 16 years of age and be in their junior year in high school. Other desired characteristics include U.S. citizenship; Texas residency; an interest in and an aptitude for math, science, engineering, or computer science; the ability to commit to a one-year relationship with JSC, including a designated one-week residential experience; and accessibility to the Internet (home, school, or public library).

The students will be selected in October and complete their online work from November to May 2001.

JSC needs volunteers to serve as mentors this spring and summer. Those interested may obtain information and complete an online mentor application via the Web site: <http://aerospacescholars.jsc.nasa.gov/> ■

Continued from Page 4

ENGINEERS

leadership in future engineering achievements depends upon ensuring that the nation's base of engineering support continues, Dr. Dunbar said.

Dr. Dunbar stated that the future of space exploration will depend upon developing the pipeline of engineers in an increasingly competitive engineering environment. "While we have many time commitments at JSC given our multiple missions, I am appreciative of all those who devoted some of their time to visit a classroom and to discuss engineering careers. It is an investment in the future of exploration and our country."

The students at League City Elementary School are still talking about Walheim's presentation.

"I showed slides of a typical shuttle mission and talked about all the different types of engineers involved, such as civil engineers who designed the launch pad, chemical engineers who developed the propellants, and mechanical engineers who designed the vehicle structures," said

Walheim. "The class asked insightful questions and was quite interested in engineering and the space program. I received letters from the students afterwards, and from what they wrote, I could tell that they really had listened intently, and understood the points I was trying to get across. It was a very enjoyable experience."

Johnson spoke to a group of fourth grade classes at Hyde Elementary, also in League City. "The teachers contacted me ahead of time, so we were able to coordinate a lesson that meshed nicely with their curriculum. The science topic of the week was Earth science, so we discussed gravity. Not only did the kids enjoy hands-on exercises with an inflatable shuttle and Earth, but also they were intrigued by the concept of zero gravity. We have lots of zero-gravity videos here to show from actual shuttle missions. I'm sure they had fun, but I also think they learned a thing or two. I know I enjoyed it."

Evaluation forms received from teachers were highly positive about the presenters. "One of the best speakers I've ever invited to my class in



NASA JSC Photo JSC2000-01932 by Benny Benavides

Dr. Bonnie Dunbar, NASA astronaut and JSC assistant director for University Research and Affairs, presents a framed collage of photos and a patch from her STS-89 mission to Sharmaine Perrilloux, assistant principal of La Marque High School. Dr. Dunbar spoke to students at the school as part of National Engineers Week activities.



NASA JSC Photo 2000-01786 by

Pat Daily, Honeywell, lectures third graders at Yeager Elementary School.

17 years of teaching," wrote Mary Patterson of Hamilton Middle School. "The speaker demonstrated excellent rapport with the students."

Teachers and students alike came away with an increased understanding of engineers and engineering as a result of the school visits. "The presenter did an excellent job in engaging the students," wrote Mary Sanchez of Jessup Elementary in the Pasadena Independent School District. "The students responded very enthusiastically and came away with a clearer understanding of the varied opportunities in the field of engineering. We were all impressed."

JSC's Education Outreach Program provides volunteers for local schools year-round, and volunteers are always needed. Employees can help educators inspire students by participating as guest speakers, career day speakers, science fair judges, mentors, and serve as science advisors through the SciAd program. ■



Bruce Powers, engineering staff, Guidance and Control Systems, United Space Alliance, lectures on astronomy and aerospace engineering at Harby Junior High School in Alvin.

Ripped from the ROUNDUP

Ripped straight from the pages of old Space News Roundups, here's what happened at JSC on this date:

1 9 7 0

The red carpet they rolled out over in Bldg. 4 is one way the Apollo 13 crew was welcomed back to MSC. The crowds at Ellington were another way; and the eyes on the TV sets all over the center at 12:07:44 CST on Friday, April 17.

Quite a celebration welcomed the three astronauts when they returned to their offices at MSC: their offices were decorated with party trimmings, the red carpet had been brought out, telegrams and good wishes papered the walls. One telegram, from the people of Halifax, Nova Scotia, ran 10' long!

1 9 7 5

An early concept of a flexible tunnel designed for Spacelab flights on space shuttle missions in the 1980s is being tested at the Marshall Space Flight Center, Huntsville, Alabama.

A tunnel will connect the Space Shuttle Orbiter's airlock with the forward end of the Spacelab to provide a pressurized passageway for crewmembers and scientists.

Using a pressurized tunnel, personnel can move to and from the orbiting space laboratory without having to don pressurized space suits. The present plan is to use a rigid tunnel with flex sections.

1 9 8 5

After a stopover at Ellington Field last week, the new orbiter *Atlantis* is scheduled to begin pre-launch processing at the Kennedy Space Center for her maiden flight later this year.

Officially designated OV-104, *Atlantis* completes the currently authorized fleet of space shuttle orbiters. It is essentially a twin of *Discovery*, the third spaceship in the fleet. This ship is named after a two-masted ketch which was operated for the Woods Hole Oceanographic Institute from 1930 to 1966.

Following its receiving inspection and post-ferry flight activities, *Atlantis* will begin processing for its maiden flight, a dedicated Department of Defense mission targeted for late September.

United Space Alliance elected to space research industry forum

United Space Alliance has been elected as a member of the National Space Biomedical Research Institute's Industry Forum.

As an Industry Forum member, United Space Alliance will help transfer NSBRI biomedical technology and research advances to the general public.

United Space Alliance, headquartered in Houston, is a Boeing/Lockheed Martin joint venture formed to conduct the Space Flight Operations Contract for NASA. USA is responsible for the day-to-day operations of the Space Shuttle Program, including ground processing, launch and landing operations at the Kennedy Space Center in Florida and flight crew equipment, flight software integration and flight operations for the Johnson Space Center in Houston.

"NSBRI welcomes the participation of United Space Alliance," said Dr. Joseph Kerwin, NSBRI Industry Forum chairman. "We are pleased to gain access to USA's expertise in understanding the direct impact of long-term space flight on the space operations community."

The NSBRI, established in April 1997 following competitive selection by NASA, is a consortium of 12 institutions leading a national effort to carry out the research necessary to assure safe human exploration of space. The Institute's research into the

health risks associated with long-duration space travel is designed to impact similar conditions found on Earth. A few of these similarities include bone loss, muscle wasting, shift-related sleep disorders and balance problems.

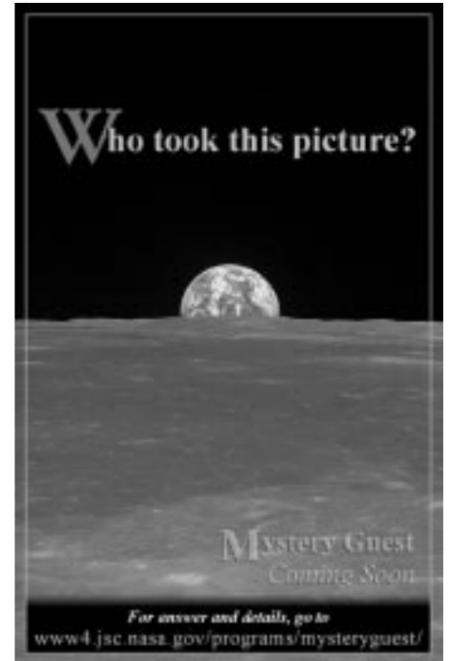
James F. Buchli, USA's International Space Station Program manager, will be the company's Industry Forum representative.

"NSBRI conducts health-related research which will be critical to mission success, including the safety and health of the crew on the International Space Station. We look forward to working with NSBRI to investigate potential applications of this research to improve upon USA's proven record of outstanding safety, reliability and performance in support of NASA's human space flight programs," Buchli said.

In addition to USA, NSBRI Industry Forum members include The Boeing Company, Draper Laboratories, InDyne, Inc., Lockheed Martin Astronautics, MBI International, Payload Systems, Inc., SGI (formerly Silicon Graphics, Inc.), Southwestern Bell, Veridian and Wyle Laboratories.

The NSBRI's consortium members are Baylor College of Medicine, which serves as the lead institution, Brookhaven National Laboratory, Harvard Medical

School, The Johns Hopkins University, Massachusetts Institute of Technology, Morehouse School of Medicine, Mount Sinai School of Medicine, Rice University, Texas A&M University, University of Arkansas for Medical Sciences, University of Pennsylvania Health System, and University of Washington. ■



GILRUTH CENTER NEWS

Sign up policy:

All classes and athletic activities are on a first-come, first-served basis. Sign up in person at the Gilruth Center and show a yellow Gilruth or weight room badge. Classes tend to fill up two weeks in advance. Payment must be made in full, cash or by check, at the time of registration. No registration will be taken by telephone. For more information, call x33345.

Gilruth badges:

Required for use of the Gilruth Center. Employees, spouses, eligible dependents, NASA retirees and spouses may apply for photo identification badges from 7:30 a.m.-9 p.m. Monday-Friday and 9 a.m.-2 p.m. Saturdays. Cost is \$10. Dependents must be between 16 and 23 years old.

Open from 6:30 a.m.-10 p.m. Monday-Thursday, 6:30 a.m.-9 p.m. Friday, and 9 a.m.-2 p.m. Saturday. Contact the Gilruth Center at (281) 483-3345.

<http://www4.jsc.nasa.gov/ah/exceaa/Gilruth/Gilruth.htm>

Nutrition intervention program: Six-week program includes lectures, a private consultation with the dietitian and blood analysis to chart your progress. Program is open to all employees, contractors and spouses. For details call Tammie Shaw at x32980.

Defensive driving: One-day course is offered once a month at the Gilruth Center. Pre-registration required. Cost is \$25. Call for next available class.

Stamp club: Meets every second and fourth Monday at 7 p.m. in Rm. 216.

Weight safety: Required course for employees wishing to use the Gilruth weight room. Pre-registration is required. Cost is \$5. Annual weight room use fee is \$90. The cost for additional family members is \$50.

Exercise: Low-impact class meets from 5:15-6:15 p.m. Mondays and Wednesdays. Cost is \$24 for eight weeks.

Step/bench aerobics: Low-impact cardiovascular workout. Classes meet from 5:15-6:15 p.m. Tuesdays and Thursdays. Cost is \$32 for eight weeks. Kristen Taraszewski, instructor.

Yoga: Stretching class of low-impact exercises designed for people of all ages and abilities in a Westernized format. Meets Thursdays 5-6 p.m. Cost is \$32 for eight weeks. Call Darrell Matula, instructor, at x38520 for more information.

Ballroom dancing: Classes meet Thursdays from 6:30-7:30 p.m. for beginner, 8:30-9:30 p.m. for intermediate and 7:30-8:30 p.m. for advanced. Cost is \$60 per couple.

Country and western dancing: Beginner class meets 7-8:30 p.m. Monday. Advanced class (must know basic steps to all dances) meets 8:30-10 p.m. Monday. Cost is \$20 per couple.

Fitness program: Health-related fitness program includes a medical screening examination and a 12-week individually prescribed exercise program. For details call Larry Wier at x30301.

Aikido: Martial arts class for men and women meets 5-6 p.m. Tuesdays and Wednesdays. No special equipment or knowledge is needed to participate. Aikido teaches balance and control to defend against an opponent without using strength or force. Beginning and advanced classes start each month. Cost is \$35 per month.

TICKET WINDOW

The following discount tickets are available at the Exchange Stores

General Cinema Theaters	\$5.50
Sony Loew's Theaters	\$5.50
AMC Theaters	\$5.00
Fiesta Texas	adult . . \$20.50 . . child (under 48 inches) . . \$17.25
Astroworld Early Bird (use by June 18)	\$17.25
Astroworld1 day . . \$21.002 day . . \$31.00
WaterWorld	\$12.00
Moody Gardens (2 events) (does not include Aquarium Pyramid)	\$10.75
Moody Gardens (Aquarium only)	\$9.25
Sea World	adult . . \$29.00 . . child (3-11 years) . . \$19.25
Space Center Houston	adult . . \$11.00 . . child (age 4-11) . . \$7.25 (JSC civil service employees free.)
Space Center Houston annual pass	\$18.75
Splash Town1 day . . \$13.00Season Pass . . \$37.50
Postage Stamps (book of 20)	\$6.60

Exchange Store hours

Monday-Friday
Bldg. 3 7 a.m.-4 p.m.
Bldg. 11 9 a.m.-3 p.m.

- All tickets are nonrefundable.
- Metro tokens and value cards are available.

For additional information, please call x35350.

Please bring your driver's license to pay by personal check.



Target fixation: a common hazard for motorcycle enthusiasts and drivers

By Brad Waugh

Most motorcycle riders have hit debris or bumps on the road that they saw but just couldn't break their fixation, so they hit them. The same type of fixation is cause for car drivers running into motorcyclists who are in their field of view.

A Texas DPS trooper friend told me of his early career as a trooper in far West Texas. There was a stretch of road where about 70 miles was uninterrupted, flat, straight highway with one lone solitary tree. Several times per year, someone would run off the road and hit this tree. His first reaction was that they must be the most luckless people alive because on

that entire stretch of road, they had picked this spot to run off the road. Upon serious pondering of what could be done to prevent this occurrence, he realized that the tree was what was causing the accidents.

The same is usually the situation when a motorcycle hits an object. The cause is because the rider is looking at the object and rides where the eyes are looking. From birth, we are taught to look at things. One of the first things taught in rider safety courses is to "look through a turn," that is, look ahead to where we are going to see any obstacles or objects in the path we want to take.

Let's take that idea further. A motorcycle rider will go where the eyes go. Try taking a ride on a fairly long straight road with little traffic. Look at some object on

the right and fix your gaze upon it for no more than two seconds and you will find you have drifted that direction. Don't take any longer to do it than that or you may be in real trouble.

Townes Van Zandt wrote in a song that "we all have holes to fill, them holes is all that's real!" Practice looking for "holes." When changing lanes, have you ever tried to ride between the stripes? It takes some close concentration to successfully avoid riding on the stripes when doing it repeatedly. The reason is because we focus on the stripes instead of the "holes" between them. This is the same as riding through traffic. If riders can consciously learn to watch for the

openings, rather than the objects, there will be far fewer injuries and accidents. Learning to seek the openings rather than fixing upon the objects will aid in evasive maneuvers. Practice this and you will see a definite difference and enjoy many more years of happy motorcycling!

Texas Department of Public Safety offers sanctioned rider safety courses at San Jacinto College (281-476-1838) and Alvin Community College (281-388-4904). Additionally you can visit the Texas Department of Public Transportation Motorcycle Safety Web page at <http://www.txdps.state.tx.us/msb/index.htm> ■



Dean Lenort, lead propellant officer for STS-99, representing the entire Propulsion Team of flight controllers, hangs the STS-99 mission plaque in the Mission Control Center. The Prop Team was bestowed the long-standing honor due to its tremendous contribution to the success of the Shuttle Radar Topography Mission. During the record-setting mission, a small nitrogen thruster mounted at the tip of the radar's outboard antenna failed. This resulted in increased Orbiter propellant usage to control the attitude of the shuttle and mast. Since initial projections showed that the mission would come up almost 30 hours short of propellant for completing the mapping mission, the propulsion team led the development of propellant conservation procedures in real-time, using new and innovative techniques to optimize vehicle control. As a result, STS-99 not only met but exceeded expectations in capturing an overwhelming amount of hi-tech Earth imagery.

"The prop folks on this flight showed what great mission support is all about," said STS-99 Lead Flight Director Paul Dye. "They took a challenging situation, and turned it around by applying their experience and creativity. I couldn't be happier with the results of this mission, and it's flight controllers like Dean that made it happen!" ■

NASA JSC Photo JSC2000-01562 by Mark Sowa

Continued from Page 1

SJOBERG

oxygen for the Command Module *Odyssey* was cut off and the three astronauts had to take refuge in the Lunar Module *Aquarius*. Dr. Sjoberg was responsible for directing the operation of the flight support complex. He worked with the flight controllers through the analysis and identification of the problems as they developed, and in devising and testing solutions. Through the work of the astronauts, flight controllers, and engineers, the Apollo 13 crew was safely returned to the Earth.

In recognition of his expert technical and managerial abilities, Dr. Sjoberg was appointed deputy director of the Johnson Space Center in January 1972, a position

he held until his retirement in 1979. As the deputy director, Sjoberg had collateral responsibility for the overall management and direction of JSC functions, programs, and resources, including: flight mission operations, medical research and operations, flight crew training and support, science and applications programs such as the Earth Resources Program, the design, development and testing of docking systems for the Apollo-Soyuz Test Program, and the design and development of the Space Shuttle Program.

Former Center Director Chris Kraft, under whom Sig worked as deputy director, remembers Sig as "a great personal friend for 57 years of my life.

He had the ability to visualize the internal workings of people, ideas, and systems. People were willing to listen to him and work with him. He could always tell me if things weren't done right. When I was worried about something, I would ask Sig to look into it. I always wanted him to be part of what was going on with me. Sig was a major contributor to the success of the Johnson Space Center. This country owes a great deal to him for his contributions to the space program."

His numerous awards and decorations include: The Medal of Freedom presented by President Nixon in 1970 for the Apollo 13 Mission Operations Team, the NASA Distinguished Service Medal,

NASA MSC Certificate of Commendation, NASA Exceptional Service Medal (received twice), and NASA MSC Superior Achievement Award. He also received an Outstanding Achievement Award from the University of Minnesota and an honorary doctor of science degree from DePauw University. He was a fellow of the American Institute of Aeronautics and Astronautics; a United States delegate to the Federation Aeronautique Internationale, Astronautics Committee; and a fellow of the American Astronautical Society.

Survivors include his wife, Betty, and three sons, Eric, Stephen, and Robert. ■

DATES & DATA**April 26**

Astronomy seminar: The JSC Astronomy Seminar Club will meet at noon April 26 and May 3 and 10 in Bldg. 31, Rm. 248A. For more information contact Al Jackson at x35037.

Spaceteam Toastmasters meet: The Spaceteam Toastmasters will meet at 11:30 a.m. April 26 and May 3 and 10 at United Space Alliance, 600 Gemini. For additional information contact Patricia Blackwell at (281) 280-6863.

April 27

Communicators Meet: The Clear Lake Communicators, a Toastmasters International club, will meet April 27 and May 4 and 11 at 11:30 at Wyle Laboratories, 1100 Hercules, Suite 305. For more information contact Allen Prescott at (281) 282-3281 or Richard Lehman at (281) 280-6557.

Radio Club meets: The JSC Amateur Radio Club will meet at 6:30 p.m. at the Piccadilly, 2465 Bay Area Blvd. For additional information contact Larry Dietrich at x39198.

May 1

NSS meets: The Clear Lake area chapter of the National Space Society will meet at 6:30 p.m. at the Parker Williams Branch of the Harris Co. Library at 10851 Scarsdale Blvd. For more information contact Murray Clark at (281) 367-2227.

NSBE meets: The National Society of Black Engineers will meet at 6:30 p.m. at Texas Southern University, School of Technology, Rm. 316. For more information contact Kimberly Topps at (281) 280-2917.

May 2

ASQ meets: The Bay Area Section of the American Society for Quality will meet at 6 pm at the Ramada King's Inn on NASA Road 1. For more information contact Ann Dorris at x38620.

May 4

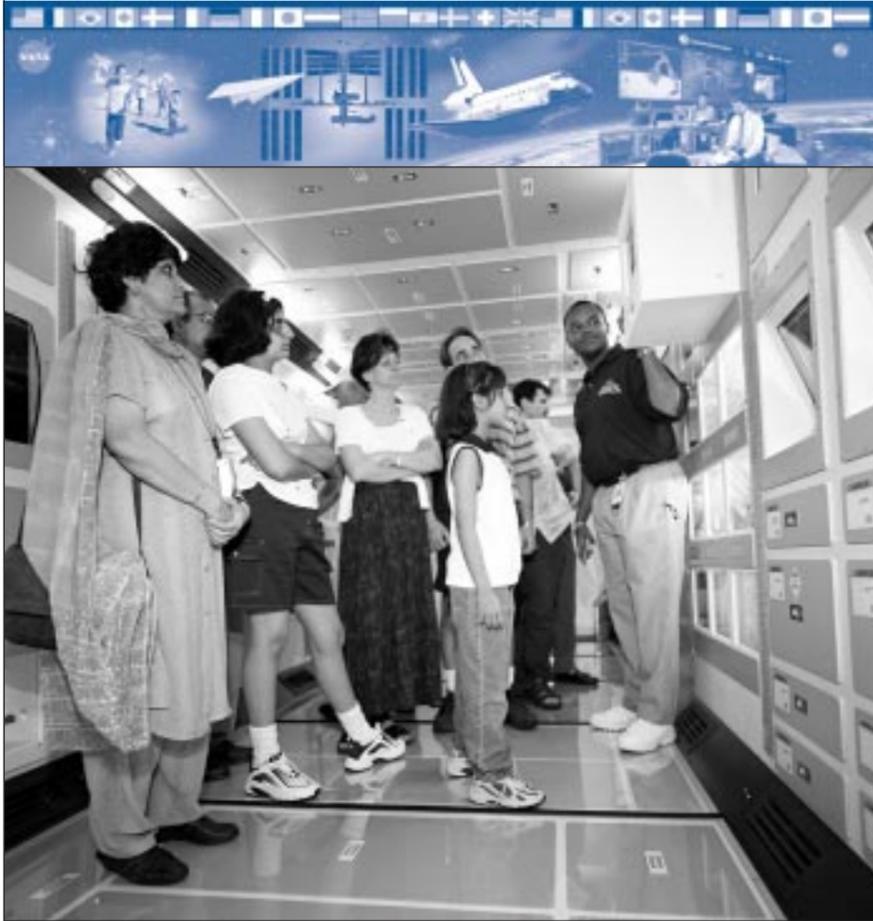
Warning System Test: The site-wide Employee Warning System will perform its monthly audio test at noon. For more information contact Bob Gaffney at x34249.

May 9

Aero Club meets: The Bay Area Aero Club will meet at 7 p.m. at the Houston Gulf Airport clubhouse at 2750 FM 1266 in League City. For more information contact Larry Hendrickson at x32050.

May 11

Airplane club meets: The Radio Control Airplane Club will meet at 7 p.m. at the Clear Lake Park building. For additional information contact Bill Langdoc at x35970.

OUT&ABOUT ★

NASA JSC Photo JSC2000-02790 by James Blair

The new International Space Station mobile exhibit made a stop at Rocket Park late March before beginning a mid-Atlantic regional tour. Local VIPs and center employees previewed the exhibit, which is housed inside two 48-foot-long trailers connected to create a sample walk-through space station interior. NASA plans to keep the trailers busy traveling the country and will periodically return them to Houston for the enjoyment of Space Center Houston visitors and JSC employees.

FOD JSC chili cookoff accepting teams**Looking for a spicy good time with friends and coworkers?**

The FOD JSC Chili Cookoff is accepting teams for the famous event. Teams from JSC, NASA contractors and related organizations are welcome to sign up for the 22nd annual event, according to cookoff co-chair Sandy Griffin.

JSC will host the cookoff from 9 a.m. - 6 p.m. May 13 at the Gilruth Recreation Center picnic area. Public tasting starts at noon. Awards will be presented at 5 p.m. for the best chili, people's choice and showmanship.

Each team is required to cook at least four gallons of chili. The entrance fee for each team is \$45. Call Griffin at (281) 483-1056 to sign up or e-mail sandra.griffin1@jsc.nasa.gov. The deadline for team sign-up is May 5.

Tickets for the cookoff cost \$4. Children 3 and under are admitted free. Tickets include admission, chili tasting, beverages, live bands, skits, games and other festivities. Tickets may be purchased through team captains from April 19 through May 5 or at the Exchange Stores in Bldgs. 3 and 11 starting April 19.

Team captains will meet April 19 to pick up cookoff details and instructions. Captains also are encouraged to attend the May 3 chili clinic at the Gilruth Recreation Center picnic area at 4:30 p.m., featuring a champion chili cookoff winner from the Chili Cookoff World Championships in Terlingua, Texas. ■

NASA BRIEFS**LEADING CANCER INSTITUTE TESTS NOVEL TECHNIQUE**

A cancer detection technique that uses an advanced sensor developed at NASA's Jet Propulsion Laboratory is being tested by the prestigious Dana-Farber Cancer Institute, Boston, Massachusetts, for use in monitoring the effectiveness of cancer treatment.

The sensor is part of a device called the BioScan System™, developed by OmniCorder Technologies, Inc., Stony Brook, New York. OmniCorder has been developing and testing the system for three years and received Food and Drug Administration clearance to market it in December 1999.

"Since we announced the BioScan System's™ clearance by the FDA, we have been inundated with requests to install and test the unit in clinics and hospitals across the country and overseas, for a variety of cancer as well as other disease applications," said OmniCorder President and CEO Mark Fauci. "We selected the Dana-Farber site because we feel that this center could best help us to have the largest and most immediate impact on improving cancer treatment."

The application at Dana-Farber is different from those that have been tested at other sites. The BioScan System™ has been used to locate and confirm the presence of a cancerous breast lesion by detecting the cancer's ability to recruit new blood supply — one of the hallmarks of a malignant lesion. The goal of the Dana-Farber research is to evaluate the BioScan System's™ ability to monitor biological effects of cancer treatment and to help physicians detect treatment-induced changes in cancerous lesions of the breast, skin and other organs. Armed with this information, they can better determine effectiveness of the treatments.

Dana-Farber is testing several new classes of anti-cancer products, including some-called antiangiogenesis factors — specifically designed to limit cancer growth by inhibiting its blood supply. (Angiogenesis is the formation and differentiation of blood vessels.) The BioScan System™ was designed to detect minute changes in blood supply to cancerous lesions and may help doctors measure precisely any decrease in blood supply to the cancer caused by these new treatments.

NASA, BOEING SIGN CONTRACT MODIFICATION

NASA and the Boeing Space and Communications Group, Houston, have signed a modification to the International Space Station contract (NAS15-10000) valued at \$26.3 million specifying planned changes to the assembly sequence baseline.

The changes included moving launch dates, deleting and adding U.S. flights, and revising the Multi-Increment Manifest (MIM). These factors required rework of the Design Analysis Cycle, Verification Analysis Cycle, mass properties and other analysis-related activities.

Work under this Cost-Plus-Award-Fee contract will be performed by Boeing in Houston as well as at Boeing Information, Space and Defense Systems locations in Huntington Beach, California; Canoga Park, California; and Huntsville, Alabama.

SPACE CENTER Roundup

The Roundup is an official publication of the National Aeronautics and Space Administration, Johnson Space Center, Houston, Texas, and is published by the Public Affairs Office for all space center employees. The Roundup office is in Bldg. 2, Rm. 181. The mail code is AP3. The main telephone number is x38648, and the fax is x32000. Electronic mail messages may be directed to:

Editor William Jeffs william.p.jeffs@jsc.nasa.gov
Assistant Editor Nicole Cloutier ncloutie@ems.jsc.nasa.gov

**PRSR STD
U.S. POSTAGE
PAID**

WEBSTER, TX
Permit No. G27